



Effects of Water Exchange Frequency on Growth Performance, Survival, and Feed Utilization of Common Carp (*Cyprinus carpio* L.) Fingerlings

Abdulkareem T. Yesser*, Qusay. H. Al-Hamadany, Khalid W. Faener, Amir A. Jabir, Aliaa S. Salman, Shaymaa A.J. Al-Jumaiee, Khelud A. Hassan, and Ali W. Ali

Department of Marine Vertebrates, Marine Science Center, University of Basrah, Basrah, Iraq.

*Corresponding Author: abdulkareemtaher@gmail.com

ARTICLE INFO

Article History:

Received: March 10, 2026

Accepted: May 29, 2026

Online: June 28, 2026

Keywords:

Sustainable aquaculture,
Water exchange
management,
Static culture system

Abstract

This study evaluates the effects of different water exchange frequencies on water quality, growth performance, survival, and feed utilization of common carp fingerlings (*Cyprinus carpio* L.) reared under static culture conditions. A total of 150 fingerlings (initial weight: 14.56 ± 1.44 g) were randomly distributed into 15 plastic tanks (54 L each) at a stocking density of 10 fish per tank (approximately 2.7 kg m^{-3}). The experiment was conducted for 56 days using five water exchange treatments with three replicate tanks per treatment: T1 (daily exchange), T2 (every 2 days), T3 (every 3 days), T4 (every 4 days), and T5 (every 5 days). Approximately 50–60% of tank water was renewed during each change. Water quality parameters, including temperature, dissolved oxygen, pH, and salinity, were monitored throughout the experiment. Growth performance and nutrient-utilization indices were significantly affected by water exchange frequency ($p < 0.05$). Fish reared under T2 and T3 showed the highest final weights (28.33 ± 1.21 and 28.60 ± 1.19 g, respectively) and weight gains (13.94 ± 0.97 and 14.02 ± 1.06 g, respectively), compared with T5, which recorded the lowest weight gain (5.87 ± 1.91 g). Weight gain in T2 and T3 increased by approximately 36–37% compared with the daily exchange treatment (T1) and by more than 130% compared with T5. Feed conversion ratio was also improved in T2 (2.901 ± 0.162) and T3 (2.921 ± 0.195) relative to T5 (7.568 ± 2.522). Survival rates were significantly higher in T1, T2, and T3 (86.66–93.33%) than in T5 (70%). These findings indicate that moderate water-change intervals (every 2–3 days) improve growth performance, feed utilization, and survival of common carp fingerlings under static culture conditions while reducing unnecessary water use.

INTRODUCTION

Cyprinus carpio, commonly known as the common carp, is extensively cultivated and ranks among the most abundant freshwater fish species worldwide (Rahman, 2015). Despite advances in aquaculture practices and improved biological understanding, carp pond production systems remain largely comparable to traditional production models (Araujo *et al.*, 2022; Hossain *et al.*, 2023; Manan *et al.*, 2023). The water exchange process is a critical management factor that strongly influences water quality and,